

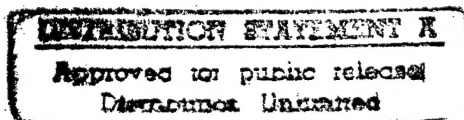
**DATE:** 4/01/97

**CONTROLLING OFFICE FOR THIS DOCUMENT IS:**

Department of the Army  
Commandant  
US Army Armor Center  
Directorate of Training and Doctrine (DTDD)  
Internet Information Services Management System  
(ILSMS)

**POC:** David Nilsen

**DISTRIBUTION STATEMENT A:** Public release



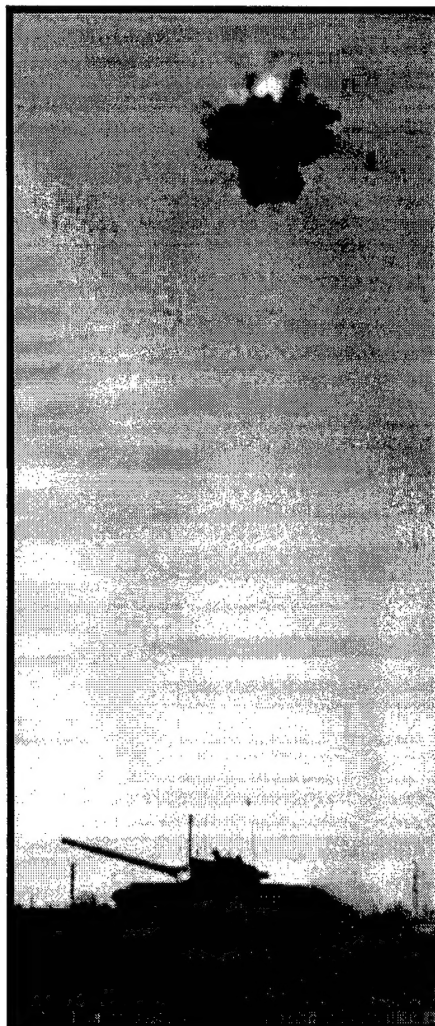
19970402 048

**DTIC QUALITY INSPECTED 3**

## **STAWs: New Threat from Above**

# **Smart Top Attack Weapons**

by Lieutenant Colonel James H. Boschma, U.S. Army (Ret.)



*(LTC Boschma is the technical director of Bosch Aerospace, a research firm in Huntsville, Ala. He is a veteran of the Vietnam War and the former commander of an armored cavalry troop, with 10 years experience in weapons research and development prior to his retirement in 1988. --Ed.)*

New Smart Top Attack Weapons (STAWs) are rapidly emerging from the research world and entering the battlefield, exposing our soldiers to a new threat. We need to develop doctrine, tactics, and a training program to tell our soldiers how they can reduce their vulnerability to this new family of antitank weapons.

The performance of the first-generation STAWs is so impressive - and the advances in STAW supporting sensor and computational technology so rapid - that we must act *now* to develop a doctrine which addresses this threat. To delay would virtually ensure that American soldiers will face STAW systems without the training and knowledge necessary to operate effectively in the STAW environment.

Emerging STAWs are highly mobile, deployable from a variety of platforms, deadly when striking intended targets, and are in the hands of potential enemy forces today. They are almost always fired from extremely long ranges, or from sites which cannot be targeted with direct-fire weapons. They search for armored targets from an optimum vantage point high above the battlefield, capitalize upon a range of modern seeker types (visible, millimeter wave radar, infrared, acoustic, and laser) to find targets, and conduct autonomous maneuver to attack the relatively thin top armor surfaces of our vehicles, thus increasing their effectiveness. <

It is in this environment of a rapidly emerging threat - probably more deadly than any of the antitank guided missile systems fielded in the past two decades - that triggers this call for another look at our doctrine, tactics, and training.

STAWs are attractive to Third World nations who do not have the financial resources or political advocacy to procure advanced armored systems. The STAW offers an effective defense against modern armor at a bargain price. Top attack sidesteps the protection value of the best modern armor, which is oriented toward defending the 60-degree frontal arc of the vehicle, and the STAWs' down-looking seekers overcome attempts at camouflage. Because of the small, portable nature of many STAW systems, they can be employed relatively covertly, do not attract patrolling aircraft, and cannot be easily seen by long range electronic sensor systems. Thus, STAWs offer Third World nations a 21st century antitank system that is possibly more effective than the easily obtained, ex-Soviet main battle tanks in the antiarmor role.

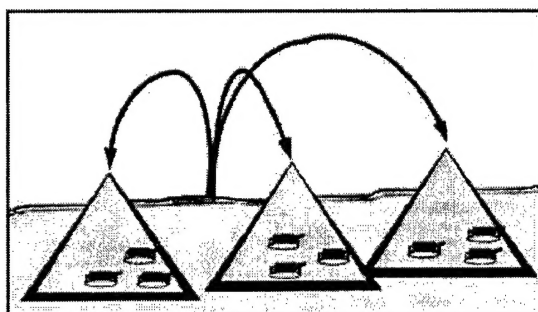
Recent advances in the development of STAWs have resulted in their fielding to (at least) two foreign armies. More than 50 non-U.S. STAW systems are known to be under development. Additionally, several successful STAW systems, in manufacture by foreign-owned aerospace and defense firms, are "for sale" on the open arms market. One Asian country is in the process of producing a low-cost STAW weapon specifically developed for world-wide sales. One analyst stated that "...We should expect to see

weapon specifically developed for world-wide sales. One analyst stated that "...We should expect to see at least 20 STAW systems in the field within the next five years." So, it is virtually certain that U.S. and Allied forces will encounter STAW systems on the battlefield.

In the winter of 1993, a STAW Foreign Military Evaluation program was undertaken by the Foreign Intelligence, Science and Technology (FSTC) Laboratory, the Army Armament Research, Development, and Engineering Center (ARDEC), and the Army Materiel Command, Smart Weapons Management Office (AMC-SWMO). Two weapons were purchased: the British-manufactured MERLIN millimeter wave-guided 81mm mortar, and the Swedish STRIX 120mm infrared-guided mortar. These two weapon systems were matched against M60 target tanks to examine their performance against moving and stationary armored vehicles. A total of nine STAWs were fired under a variety of environmental conditions. Of these, five found their intended targets and either damaged or destroyed them.

While both weapon types managed to hit targets, the infrared 120mm mortar was especially effective. Its thermal-enhanced warhead easily penetrated the M60's topside armor. It then penetrated and exited through the floor of the tank. Its over-pressure and fragmentation performance inside the tank appeared lethal to the crew, and possibly the vehicle. It can be fired from reverse slope positions up to seven kilometers from its intended target, and its ability to detect and strike armor was clearly evident during the Eglin tests.

Of major concern is the combination of viewing geometry, and sensing spectrum (typically IR or MMW) that is achieved by STAW weapons. These two factors serve to negate, or at least substantially dilute, many years of research and lessons learned concerning the management of visible signatures of armored vehicles. Battlefield STAWs require new thinking about vehicle signatures and countermeasures against top attack targeting sensors.



Typical STAW attack scenario.

The STAW realities require development of a strategy for operations in this new top attack environment. U.S. forces have never been subjected to STAW attack, and we have thus concentrated our doctrine and tactics development, as well as our countermeasure developments, upon threats previously encountered. Our general thought process has always been to concentrate upon the capabilities the enemy has widely deployed today, not upon those he may display tomorrow. History is replete with examples of military disaster facilitated by such thought, such as the fate of the Israeli 2nd Armored Brigade, which fell to Egyptian Sagger, or the "Fokker Scourge" of WWI, where German machine guns firing through propellers decimated Allied aviation for nearly a year. Today, the computer age is upon us, and technology is moving forward at an unprecedented pace. The rate of technological development demands that we aggressively look forward at the emerging threat, and define a doctrine which addresses not only the last battle, but both the last *and* our vision of the next. These words are not meant to downplay the need for conventional defenses, but rather to emphasize the need for serious consideration of emerging threat technology as part of every design, tactic, training, and doctrinal development. The STAW is one threat that we cannot afford to relegate to the status of "insignificant." Wishing it away will not make it go away.

There is much to be done, and delay is not acceptable: delay may well be measured in American lives. We must develop a fuller understanding of what the STAW sees as it looks down upon our forces, and then develop tactics that we impart to our troops to reduce their vulnerability. Techniques and procedures to reduce STAW vulnerability can be developed at low cost, in conjunction with training and

testing already underway. We have the tools to collect the information needed, and the expertise to convert observations to a list of actions that support our warfighters. TRADOC can then develop the doctrine, tactics, and training programs needed to impart this knowledge to individual soldiers and reduce the significance of the STAW threat.

Simultaneously, the Research and Development (R&D) community must continue to advance technologies which offer STAW countermeasures. Countermeasures may range from coatings to reduce our emitted and reflected signatures, to decoys which can draw the STAW's fire, to active countermeasure technologies which can impair or kill the STAWs before they hit our vehicles. These approaches need to be found, nurtured and then fielded. Because the foreign STAWs are in the process of being fielded, we need to move forward very rapidly in these endeavors.

There must be a renewed level of interest in the emerging STAW threat, and rapid development, especially of doctrine and training programs, to reduce the effects of STAWs on the battlefield. I emphasize the first step (doctrine, tactics, and training) because these are areas that can be addressed now, versus the materiel development cycle, which usually takes many years to deliver countermeasures. Those of you at the service schools, battle labs, and within TRADOC must become active players in the early assessment of the STAW threat.

The development community needs to review the progress of foreign STAWs, and then establish priorities which will provide our forces with the best countermeasures technology can yield. Do it soon; otherwise, the requirement may be accentuated in American blood after the next battle.

If we, the soldiers, scientists, and Army managers, can agree on the STAW danger, prioritize its importance, and move together to develop doctrine, tactics, training, and technology, our forces can overcome this new threat. We can then advance into the new century with the knowledge that our front line troops have all the tools needed for survival and effectiveness in combat, and that our combat power is second to none.

**Go to Next Section: Javelins and Skirmishers on the Battlefield**

**Return to the Table of Contents**

---

08 Mar 97/dcn

*"Issues in Armor" I have some feedback. Add your thoughts to the discussion*

*Questions for the Armor Magazine Staff, including subscriptions, etc.*

*For technical questions on this web page, send email to Dave Nilsen*